

CRASH CUSHION TYPE G

Diagram illustrating the dimensions and components of a CRASH CUSHION TYPE G, showing the transition from a guardrail to a crash cushion and back to a guardrail.

Key Dimensions and Labels:

- LENGTH OF NEED (LON):** The total length of the crash cushion system.
- CLEAR ZONE:** The area before and after the crash cushion where no obstructions are present.
- RECOVERY AREA:** The area between the crash cushion and the guardrail, defined by a 4:1 or flatter slope.
- HINGE POINT:** The point where the crash cushion meets the recovery area.
- APPROACH LENGTH:** The length of the approach slope leading to the crash cushion.
- TRANSITION TO EXISTING SLOPE:** The slope leading from the crash cushion back to the existing road grade.
- EDGE OF SHOULDER:** The boundary of the shoulder on the right side.
- GUARDRAIL OR TRANSITION:** The structure at the end of the crash cushion.
- CRASH CUSHION:** The main energy-absorbing structure.
- SEE NOTE 4:** Reference to the crash cushion design details.
- SEE NOTE 5 & 6:** Reference to the recovery area design details.
- SEE NOTE 7:** Reference to the transition slope design details.
- SEE NOTE 8:** Reference to the guardrail or transition design details.
- SEE NOTES 2 & 9:** Reference to the crash cushion design details.

The diagram shows a cross-section of the crash cushion system. The crash cushion is represented by a series of vertical lines (1, 2, 3, 4, 5, 6, 7) and a central vertical line (8). The recovery area is defined by a 4:1 or flatter slope. The approach slope is defined by a 10:1 or flatter slope. The transition to existing slope is defined by a 10:1 or flatter slope. The guardrail or transition is shown at the end of the crash cushion. The diagram also shows the clear zone, hinge point, and edge of shoulder.

$$D \times \text{TAPER} = \text{APPROACH LENGTH}$$

1. APPROVED SYSTEMS: ET-2000 AND ET-PLUS MANUFACTURED BY TRINITY INDUSTRIES AND THE SKT-350, MANUFACTURED BY ROAD SYSTEMS INC. REFER TO UDOT'S GUIDELINES FOR CRASH CUSHIONS AND END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
2. SYSTEM OFFSET:
 - A. INSTALL SYSTEM WITH 2 FOOT OFFSET (25:1 FLARE RATE) WHEN USED WITH A TANGENT BARRIER SYSTEM.
 - B. INSTALL SYSTEM AT THE SAME FLARE RATE AS THE BARRIER IT IS BEING ATTACHED TO.
3. REFER TO UDOT'S GUIDELINES FOR CRASH CUSHION AND END TREATMENTS FOR POST REQUIREMENTS.
 - A. POST 1
 - 1) ET SERIES-HINGE BREAKAWAY POST (HBA)
 - 2) SKT-350 PLUG WELDED POST INSIDE FOUNDATION TUBE
4. RAIL ELEMENTS
 - A. USE 12 $\frac{1}{2}$ FOOT RAIL ELEMENTS AS SPECIFIED BY THE SYSTEM MANUFACTURER.
 - B. DO NOT BOLT RAIL ELEMENT AT POST 1.
 - C. REFER TO MANUFACTURE SPECIFICATIONS FOR OTHER RAIL TO POST BOLT REQUIREMENTS.
5. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
 - A. USE 10:1 OR FLATTER SLOPES IN APPROACH AREA.
 - B. USE 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN THE RECOVERY AREA.
 - 1) IF A 4:1 FORESLOPE IN RECOVERY AREA IS IMPRACTICAL USE A MAXIMUM 3:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 4:1 OR FLATTER.
 - C. USE A 4:1 BACKSLOPE TO THE CLEAR ZONE LIMIT IN THE RECOVERY AREA. IF A 4:1 BACKSLOPE CANNOT BE ESTABLISHED A 3:1 BACKSLOPE IS PERMITTED.
6. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
 - A. DO NOT PLACE SIGNS OR POLES IN APPROACH AREA.
 - B. USE BREAKAWAY SIGNS OR POLES WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FOOT CLEARANCE TO THE SIDES AND REAR OF THE SYSTEM.
7. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS. SEE STD DWG CC8B FOR EXCEPTIONS.
8. USE GUARDRAIL TRANSITION, STD DWG BA 4 SERIES, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
9. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.
10. USE THE CURRENT EDITION, ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE REQUIREMENT AND LENGTH OF NEED (LON) REQUIREMENTS.
11. WHEN ROADWAY DESIGN REQUIRES A 12' OR WIDER EFFECTIVE SHOULDER THE 2' MIN BARRIER OFFSET IS OPTIONAL.

Diagram illustrating the geometry of a shoulder fillet weld joint. The diagram shows a cross-section of the joint with a fillet weld. Key dimensions and labels include:

- 5'**: Dimension indicating the height of the weld reinforcement.
- VARIABLES BASED ON DESIGN**: Text indicating that the weld geometry is variable based on design requirements.
- EDGE OF SHOULDER**: Label pointing to the edge of the shoulder.

SEE NOTE 11

VARIES BY DESIGN

EDGE OF TRAVEL LANE

10:1 OR FLATTER

CLEAR ZONE LIMIT

VARIES

4:1 OR FLATTER

4:1 OR FLATTER

3:1 MAX

SEE NOTES 5 & 6

4:1 OR FLATTER

CLEAR ZONE LIMIT

RECOVERY AREA

SEE NOTES 5 & 6

TYPICAL SECTION C-C




POSTS 5-8

SEE NOTE 3

STEEL HINGED POST OR
PLUG WELDED POST IN
FOUNDATION TUBE.
SEE NOTE 3

SUPPLEMENTAL DRAWING

REVISIONS			
1	10-30-08	MEE	ADDED NOTE 11, REVISION NOTE 6 AND TABLE 1.
NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION SALT LAKE CITY, UTAH	
RECOMMENDED FOR APPROVAL 	OCT. 30/12
CHAIRMAN STANDARDS COMMITTEE APPROVED 	DATE OCT. 30/12
DEPUTY DIRECTOR 	DATE

GRADING AND INSTALLATION DETAILS CRASH CUSHION TYPE G

STD DWG
CC 8A

STANDARD DRAWING TITLE